

Claims:

1. An integral injection molding and in-mold coating apparatus, comprising:
 - a frame;
 - a first mold member fixedly secured to the frame and a second mold member movably secured to the frame for selective movement relative to the first mold member, the second mold member movable to a closed position adjacent the first mold member for forming a mold cavity;
 - a first composition injector secured to the frame for selectively injecting a first substrate composition into the mold cavity to form a molded article therein;
 - a second composition injector secured to one of the first mold member and the second mold member for selectively injecting a second coating composition into the mold cavity and onto the molded article to in-mold coat the molded article; and
 - controls disposed on the frame for adjustably controlling injection parameters for injecting said first composition and injection parameters for injecting said second composition.
2. The integral injection molding and in-mold coating apparatus of claim 1 further including a dispense apparatus disposed on the frame and fluidly connected to the second composition injector.
3. The integral injection molding and in-mold coating apparatus of claim 2 wherein the dispense apparatus includes:
 - a receiving cylinder for holding a container of the second composition;
 - a metering cylinder in fluid communication with the container and the second composition injector;
 - a pump fluidly connected the metering cylinder for transferring the second composition from the container to the metering cylinder; and
 - a hydraulic means connected to the metering cylinder for selectively evacuating the second composition from the metering cylinder and directing the second composition to the second composition injector.

4. The integral injection molding and in-mold coating apparatus of claim 2 wherein the set of controls includes a touch screen user interface that controls the first composition injector, the second composition injector and the dispense apparatus.

5. The integral injection molding and in-mold coating apparatus of claim 2 further including only a single compressed air source connection connected to the dispense apparatus, the first composition injector and the second composition injector.

6. The integral injection molding and in-mold coating apparatus of claim 2 further including only a single electrical source connection electrically connected to the dispense apparatus, the first composition injector and the second composition injector.

7. The integral injection molding and in-mold coating apparatus of claim 1 further including a clamp mechanism that selectively maintains the second mold member in the closed position and in fixed relation relative to the first mold member by application of a clamping pressure.

8. The integral injection molding and in-mold coating apparatus of claim 1 wherein the mold cavity defined by the first and second mold members has a fixed volume when the first mold member is in the closed position.

9. The integral injection molding and in-mold coating apparatus of claim 1 wherein the mold cavity defined by the first and second mold members is a contained cavity.

10. The integral injection molding and in-mold coating apparatus of claim 1 further including:

a dispense apparatus disposed on the frame and fluidly connected to the second injector for providing the second composition to the second
5 injector under an injection pressure; and

a display means that displays information related to at least one of the first injector, the second injector and the dispense apparatus.

11. The integral injection molding and in-mold coating apparatus of claim 10 wherein the display means communicates information related to each of the first composition injector, the second composition injector and the dispense apparatus.

12. The integral injection molding and in-mold coating apparatus of claim 11 wherein the display means is a monitor.

13. The integral injection molding and in-mold coating apparatus of claim 2 wherein the injection parameters include at least one of (a) the amount of said second composition injected, (b) when in the molding process said second composition is injected, (c) the pressure at which said second
5 composition is injected, (d) the duration for which said second composition is injected, (e) the amount of said first composition injected, (f) the pressure at which said first composition is injected, and (g) the duration for which said first composition is injected.

14. An integral injection molding and in-mold coating apparatus, comprising:

a first mold member and a second mold member forming a contained molding cavity therebetween;

5 a first composition injector connected to one of the first and second mold members and fluidly connected to the contained molding cavity for injecting a first composition into the contained molding cavity to form a molded article therein;

a second composition injector connected to one of the first and second
10 mold members and fluidly connected to the contained molding cavity for

injecting a second composition into the contained molding cavity and onto the molded article to in-mold coat the molded article; and

a dispensing apparatus rigidly connected to the first and second composition injectors, the dispensing apparatus having a metering cylinder
15 fluidly connected to the second composition injector.

15. The integral injection molding and in-mold coating apparatus of claim 14 further including a single set of controls for adjustably setting parameters of the first composition injector, the second composition injector and the dispense apparatus.

16. The integral injection molding and in-mold coating apparatus of claim 15 further including:

a clamp mechanism for moving the first mold member relative to the second mold member, the contained molding cavity formed when the first
5 mold member is in a closed position.

17. The integral injection molding and in-mold coating apparatus of claim 16 wherein the single set of controls operates the clamp mechanism.

18. The integral injection molding and in-mold coating apparatus of claim 14 including a single display device that shows information related to the first composition injector, the second composition injector and the dispense apparatus.

19. The integral injection molding and in-mold coating apparatus of claim 18 wherein the single display device includes a touch screen interface that allows adjustments to parameters of the first composition injector, the second composition injector and the dispense apparatus to be made by
5 touching the display device in specified locations.

20. The integral injection molding and in-mold coating apparatus of claim 14 wherein the dispense apparatus includes:

a receiving cylinder for holding a container of the second composition that is in fluid communication with the metering cylinder;

5 a pump fluidly connected the metering cylinder for transferring the second composition from the container to the metering cylinder; and

a hydraulic cylinder connected to the metering cylinder for selectively evacuating the second composition from the metering cylinder and directing the second composition to the second composition injector.

21. An injection molding machine and in-mold coating apparatus, comprising:

an injection molding machine including first and second mold members that form a molding cavity therebetween and a first composition injector for
5 selectively injecting a first composition into the molding cavity to form a molded article therein;

a second composition injector connected to one of the first and second mold members for selectively injecting a second composition into the molding cavity and onto the molded article to in-mold coat the molded article;

10 a dispense apparatus separate from the injection molding machine and connected to the second composition injector by a fluid line; and

a set of controls on one of the injection molding machine and the dispense apparatus that adjustably controls parameters of the first composition injector, the second composition injector and the dispense
15 apparatus.